

*Rewrite the claims to read as follows:*

129. (Amended) A method of identifying a compound of interest in a library of compounds, each of said compounds being bound to a solid support and being produced by a unique reaction series composed of N reaction steps, wherein N is an integer of at least 2, and wherein each compound is produced from components which are independently the same or different, the method comprising:

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- (a) dividing a population of solid support into M batches, wherein M is an integer greater than 1;
  - (b) reacting each of the M batches of solid support with a component, so that the component forms a bond with the solid support;
  - (c) adding to one or more batches, prior to (b), concurrently with (b), or subsequently to (b), one or more tag(s), each tag able to be attached to the solid support and able to be identified by optical interrogation, wherein said one or more tag(s) constitutes a code, which code is uniquely associated with a compound and a corresponding reaction sequence and is determined by optical interrogation;
  - (d) recombining all of said M batches after (b) and (c);
  - (e) repeating (a) to (d) for N-1 times, or repeating (a) to (d) for N-2 times followed by repeating (a) to (c) once, to produce a library of compounds;
  - (f) performing an assay capable of indicating that any compound in the library has a property of interest; and

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(g) decoding the code composed of one or more tag(s) to identify the compound associated with the code, wherein the decoding step is carried out without isolating the solid support of interest from other solid supports and without detaching any of the tags(s) from the solid support of interest and wherein said decoding step comprises in-situ optical interrogation of the tag(s).

130. (Amended) The method of claim 160 wherein the solid support comprises a bead.

131. (Amended). The method of claim 160 wherein (c) comprises repeating (a) to (d) for N-1 times to produce a library of compounds.

132. (Amended) The method of claim 160, wherein (e) comprises repeating (a) to (d) N-2 times followed by repeating (a) to (c) once to produce a library of compounds.

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134. (Amended) The method of claim 160, wherein each fluorophore tag is in substoichiometric amount compared to the component added in (b).

135. (Amended) The method of claim 160, wherein each fluorophore tag added in (c) is from about 0.001 to about 0.1 molar equivalent to the component added in (b).

136 (Amended) The method of claim 160, wherein the optical interrogation of each fluorophore tag comprises determining its relative abundance.

137. (Amended) The method of claims 160, wherein each fluorophore tag is attached to the solid support by covalent bonding.

138. (Amended) The method of claim 160, wherein the fluorophore tag is capable of forming a bond to the solid support directly or to the component attached to said solid support.

139 (Amended) The method of claim 160, wherein the fluorophore tag is a dye selected from the group consisting of compounds with the following chemical structures:

3-(ε-carboxypentyl)-3'-ethyl-oxacarbocyanine-6,6'-disulfonic acid,

1-(ε-carboxypentyl)-1'-ethyl-3,3,3',3'-tetramethylindocarbocyanine-5,5'-disulfonic acid,

1-(ε-carboxypentyl)-1'-ethyl-3,3,3',3'-tetramethyl-3H-benz(e)indocarbocyanine-5,5',7,7'-tetrasulfonic acid, and

1-(ε-carboxypentyl)-1'-ethyl-3,3,3',3'-tetramethylindocarbocyanine-5,5'-disulfonic acid, and is activated as an active ester selected from the group consisting of succinimidyl, sulfosuccinimidyl, p-nitrophenol, pentafluorophenol, HOBt and N-hydroxypiperidyl.

140. (Amended) The method of claim 160, wherein the fluorophore tag is a dye selected from the group consisting of compounds with the following chemical structures:

6-((4,4-difluoro-5,7-dimethyl-4-bora-3a,4a-diaza-s-indacene-3-propionyl)amino) hexanoic acid,

6-((4,4-difluoro-5-phenyl-4-bora-3a,4a-diaza-s-indacene-3-propionyl)amino) hexanoic acid,

6-((4,4-difluoro-1,3-dimethyl-5-(4-methoxyphenyl)-4-bora-3a,4a-diaza-s-indacene-2-propionyl) amino)hexanoic acid,

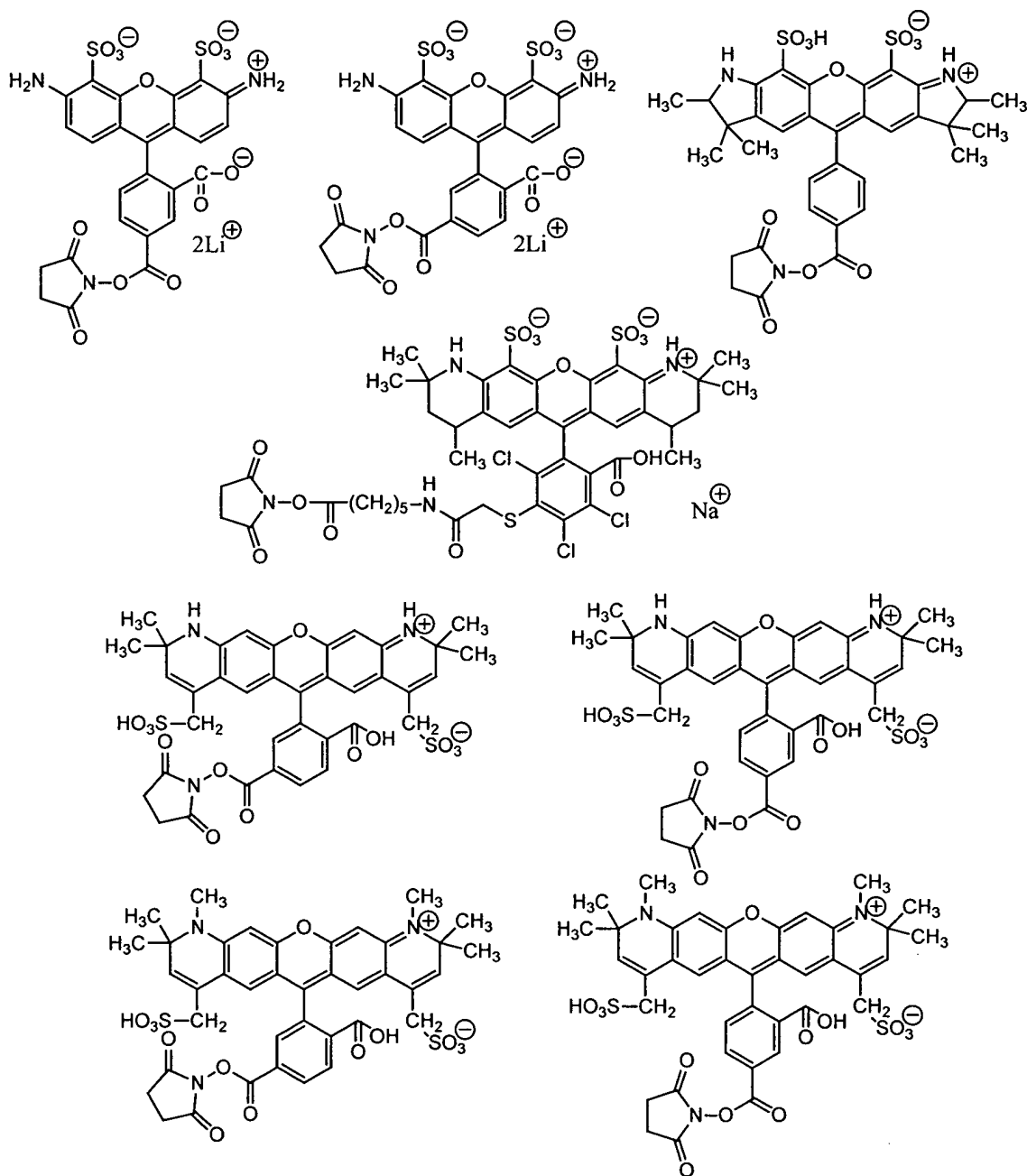
6-(((4-(4,4-difluoro-5-(2-thienyl)-4-bora-3a,4a-diaza-s-indacene-3-yl)phenoxy) acetyl)  
amino)hexanoic acid,

6-(((4-(4,4-difluoro-5-(2-thienyl)-4-bora-3a,4a-diaza-s-indacene-3-yl)styryloxy)acetyl)  
aminohexanoic acid, and

6-(((4-(4,4-difluoro-5-(2-pyrrolyl)-4-bora-3a,4a-diaza-s-indacene-3-yl)styryloxy)  
acetyl)aminohexanoic acid,

and is activated as an active ester selected from the group consisting of succinimidyl,  
sulfosuccinimidyl, p-nitrophenol, pentafluorophenol, HOBt and N-hydroxypiperidyl.

141. (Amended) The method of claim 160, wherein the fluorophore tag is a dye selected from the group consisting of compounds with the following chemical structures:



142. (Amended) The method of claim 160, wherein (g) is carried out using multi-color fluorescence imaging or spectral imaging analysis.

143. (Amended) The method of claim 160, wherein the decoding is carried using multi-color fluorescence imaging in combination with spectral analysis.

144. (Amended) The method of claim 160, wherein M is an integer from at least 2 to 25.

145. (Amended) The method of claim 160, wherein the component is protected or unprotected at a group which is capable of participating in a further coupling reaction and orthogonally protected at non-participating group(s), and wherein (d) further comprises cleaving any protecting group of the component which is to participate in a further coupling reaction.

146. (Amended) The method of claim 160, wherein the fluorophore tag is optically distinguishable by emission wavelength.

147. (Amended) The method of claim 160, wherein the fluorophore tag is optically distinguishable by emission intensity by adjusting the ratio of the relative quantities of the fluorophore tags.

148. (Amended) The method of claim 147, wherein the ratio is from about 1:1 to 4:1.

149. (Amended) The method of claim 160, wherein the fluorophore tag is optically distinguishable by excited-state lifetime.

150. (Amended) The method of claim 160, wherein the fluorophore tag is optically distinguishable by emission wavelength, excited-state lifetime and emission intensity.

151. (Amended) The method of claim 160, wherein the compound of interest comprises an oligonucleotide or nucleic acid.

154. (Amended) The method of claim 160, wherein N is an integer from at least 4 to about 12.

*Please add the following new claims:*

160. (New) The method of claim 129, wherein the tag in (c) comprises a fluorophore tag.

161. (New) The method of claim 129 wherein the tag in (c) comprises a chromophore tag.

162. (New) The method of claim 129 wherein the code is a binary code, an extended binary code, or a simple code.

163. (New) The method of claim 147, wherein a difference in emission intensity is the result of a difference in the ratio of relative quantities of fluorophore tags.

**Remarks**

Claims 129-163 are pending the application. Claims 152-153 are withdrawn from consideration by the Examiner as being drawn to a non-elected species. Claims 129-132, 134-151 and 154 have been amended and Claim 160-163 have been added. Claims 129-151 and 154-163 are thus currently presented for examination. A mark-up of the claims amended herein is set forth in Appendix A.